

Listing of the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. **(Previously presented)** An apparatus for metering the volume of an aerosolized fluid, the apparatus comprising:

a chamber comprising a gas region and a fluid region;

an atomizer in fluid communication with the fluid region of the chamber for aerosolizing fluid delivered from the fluid region;

an acoustic source configured to be acoustically coupled to the gas region of the chamber;

a microphone configured to be acoustically coupled to the gas region of the chamber; and

a processor configured to receive a signal from the microphone, and further configured to determine a volume of the gas region of the chamber based on the received signal and thereby to determine a corresponding volume of aerosolized fluid.

2. **(Previously presented)** The apparatus of claim 1, wherein the acoustic source is embedded on a printed circuit board.

3. **(Previously presented)** The apparatus of claim 1, wherein the microphone is embedded on a printed circuit board.

4. **(Previously presented)** The apparatus of claim 1, wherein a printed circuit board is disposed within a housing, and wherein the printed circuit board defines a first volume and a second volume within the housing.

5. **(Previously presented)** The apparatus of claim 4, wherein the processor is further configured to send a control signal to a valve, the control signal associated with the volume of the gas region of the chamber.

6. **(Original)** The apparatus of claim 5, wherein the control signal includes information associated with releasing an amount of fluid.

7. **(Original)** The apparatus of claim 5, wherein the control signal is further associated with a volume of fluid in aerosolized form.

8. **(Previously presented)** An apparatus for metering the volume of an aerosolized fluid, the apparatus comprising:

a housing containing a first volume and a second volume, the housing configured to be acoustically coupled to a chamber comprising a gas region and a fluid region; an atomizer in fluid communication with the fluid region of the chamber for aerosolizing fluid delivered from the fluid region;

a first microphone disposed within the first volume;
a second microphone disposed within the second volume;

a printed circuit board disposed within the housing such that the printed circuit board separates the first volume from the second volume, the printed circuit board including an acoustic source; and

a processor configured to calculate a change in volume of the gas region of the chamber, and thereby to determine a quantity of fluid delivered to the atomizer.

9. **(Original)** The apparatus of claim 8, wherein the printed circuit board further includes the processor.

10. **(Previously presented)** The apparatus of claim 8, wherein the chamber is contained in a removable cassette, and wherein the second volume is acoustically coupled to the chamber by a port.

11. **(Original)** The apparatus of claim 8, wherein the printed circuit board includes an inner layer configured to pass electrical signals.

12. **(Original)** The apparatus of claim 8, wherein the processor is further configured to receive a signal from the first microphone; receive a signal from the second microphone; and output a control signal to a valve, the control signal being associated with the received signal from the first microphone and the received signal from the second microphone.

13. **(Original)** The apparatus of claim 8, wherein the printed circuit board includes a means for pressure equalization between the first volume and the second volume.

14. **(Canceled)**

15. **(Original)** The apparatus of claim 8, wherein the acoustic source is a piezoelectric speaker.

16. **(Previously presented)** An apparatus for metering the volume of fluid delivered as an aerosol, the apparatus comprising:

an atomizer for aerosolizing fluid;

a housing configured to be in communication with a valve, the housing containing a first volume, a second volume and a third volume including a gas region and a fluid region, the gas region acoustically coupled to the second volume and the fluid region coupled to the atomizer;

a printed circuit board disposed within the housing such that the printed circuit board separates the first volume from the second volume, the printed circuit board including

an acoustic source;

a first microphone disposed within the first volume;

a second microphone disposed within the second volume;

and

a processor configured to calculate a change in volume of the gas region and thereby to determine an amount of fluid output to the atomizer.

17. (Original) The apparatus of claim 16, wherein the printed circuit board further includes the processor.

18. (Original) The apparatus of claim 16, wherein the second volume is acoustically coupled to the third volume by a port.

19. (Original) The apparatus of claim 16, wherein the printed circuit board includes an inner layer configured to pass electrical signals.

20. (Original) The apparatus of claim 16, wherein the processor is further configured to

receive a signal from the first microphone;

receive a signal from the second microphone; and

output a control signal to the valve, the control signal being associated with the received signal from the first microphone and the received signal from the second microphone.

21. **(Original)** The apparatus of claim 16, wherein the printed circuit board includes a means for pressure equalization between the first volume and the second volume.

22. **(Original)** The apparatus of claim 16, wherein the acoustic source is a piezoelectric speaker.

23. **(Original)** The apparatus of claim 16, wherein the third volume is an air region that is separated from a fluid region by a diaphragm, and wherein the air region and the fluid region form a fixed volume.

24. **(Previously presented)** An apparatus for metering the volume of an aerosolized fluid, the apparatus comprising:

a housing configured to be in communication with a valve;

a printed circuit board disposed within the housing such that the printed circuit board defines a first volume and a second volume including a gas region and a fluid region, the printed circuit board including

an acoustic source;

a first microphone disposed within the first volume;

a second microphone disposed within the second volume;

and

a processor configured to calculate a change in volume of the gas region and thereby to determine an amount of fluid output from the fluid region for aerosolization.

25. **(Original)** The apparatus of claim 24, wherein the printed circuit board further includes the processor.

26. **(Original)** The apparatus of claim 24, wherein the printed circuit board includes an inner layer configured to pass electrical signals.

27. **(Original)** The apparatus of claim 24, wherein the processor is further configured to receive a signal from the first microphone; receive a signal from the second microphone; and output a control signal to the valve, the control signal being associated with the received signal from the first microphone and the received signal from the second microphone.

28. **(Original)** The apparatus of claim 24, wherein the printed circuit board includes a means for pressure equalization between the first volume and the second volume.

29. **(Original)** The apparatus of claim 24, wherein the acoustic source is a piezoelectric speaker.

30. **(Original)** The apparatus of claim 26, wherein the second volume is an air region that is separated from a fluid region by a diaphragm, and wherein the air region and the fluid region form a fixed volume.